

CLAIMS

1. A lubrication system for an internal combustion engine, the system comprising:

an oil pump driven by the engine and supplying pressurized oil through a main oil feed to a main bearing gallery, a cam gallery, and a cam phaser;

a first pressure increasing valve connected between the oil pump and the main bearing gallery and operative to selectively limit flow to the main bearing gallery and thereby raise oil pressure supplied to the cam phaser to a desired operating level greater than the oil pressure supplied to the main bearing gallery;

a second pressure increasing valve connected between the main bearing gallery and the cam gallery and operative to selectively limit oil flow to the cam gallery and thereby raise oil pressure supplied to the main bearing gallery and the cam phaser to a desired operating level greater than the oil pressure supplied to the cam gallery; and

a pressure regulator valve connected between the second pressure increasing valve and the cam gallery and operative to regulate oil pressure to the cam gallery to alter valve train operation.

2. A system as in claim 1 wherein the pressure regulator valve maintains a low oil pressure to the switching lifters during engine operation for low step valve train operation.

3. A system as in claim 1 wherein the pressure regulator valve maintains a high oil pressure to the switching lifters during engine operation for high step valve train operation.

4. A system as in claim 1 wherein the pressure regulator valve provides adequate oil pressure to the switching lifters during engine operation for cylinder deactivation.
5. A system as in claim 1 wherein the first pressure increasing valve includes an open orifice limiting oil flow to the cam gallery and the main bearing gallery to maintain a desired minimum oil pressure to the cam phaser at lower engine speeds.
6. A system as in claim 1 wherein the second pressure increasing valve includes an open orifice limiting oil flow to the cam gallery to maintain a desired minimum oil pressure to the main bearing gallery and cam phaser at lower engine speeds.
7. A system as in claim 5 wherein the first pressure increasing valve maintains adequate cam phaser oil pressure during engine operation.
8. A system as in claim 6 wherein the second pressure increasing valve increases oil pressure to the cam gallery as engine speed increases.
9. A system as in claim 1 wherein the cam gallery receives oil from the main bearing gallery.
10. A system as in claim 1 including an oil pickup connected with an inlet of the pump to draw in oil from an engine oil pan.
11. A system as in claim 1 including an oil filter connected between the outlet of the oil pump and the main oil feed.